

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings of claims in the application:

**Listing of Claims:**

- 1                   1.       **(Original)** A charge-switch nucleotide phosphate (NP) probe, said NP  
2 probe comprising:  
3                   an intact NP probe having a terminal phosphate with a fluorophore moiety  
4 attached thereto, said intact NP probe having a first molecular charge associated therewith,  
5 whereupon cleavage of said terminal phosphate as a phosphate fluorophore moiety, said  
6 phosphate fluorophore moiety carries a second molecular charge, wherein the difference between  
7 said first molecular charge and said second molecular charge is at least 0.5.
- 1                   2.       **(Original)** The charge-switch NP probe according to claim 1, wherein  
2 either said intact NP probe has a positive molecular charge, or wherein upon cleavage of said  
3 terminal phosphate fluorophore moiety, said terminal phosphate fluorophore moiety carries a  
4 molecular positive charge relative to said intact NP probe.
- 1                   3.       **(Currently Amended)** The charge-switch NP probe according to claim 1,  
2 ~~wherein said charge-switch NP probe is a nucleotide triphosphate (NTP); and~~ wherein said  
3 terminal phosphate is a pyrophosphate with a fluorophore moiety attached thereto.
- 1                   4.       **(Currently Amended)** The charge-switch NP probe according to claim 1,  
2 ~~3, wherein said intact NTP probe~~ wherein said intact charge-switch NP probe has a positive  
3 charge.
- 1                   5.       **(Currently Amended)** The charge-switch NP probe according to claim 1,  
2 ~~3,~~ wherein upon cleavage of said terminal phosphate as a pyrophosphate fluorophore moiety,  
3 said pyrophosphate fluorophore moiety carries a positive charge relative to ~~said intact NTP~~  
4 ~~probe~~ said intact charge-switch NP probe
- 1                   6.       **(Currently Amended)** The charge-switch NP probe according to claim 1,  
2 ~~3, wherein said NTP probe~~ wherein said charge-switch NP probe is a member selected from

3 the group consisting of a deoxynucleotide triphosphate (dNTP), and a nucleotide triphosphate  
4 (NTP).

1                   7.       **(Currently Amended)** The charge-switch NP probe according to claim 6,  
2 wherein said ~~NTP~~ **charge-switch NP** probe is a deoxynucleotide triphosphate (dNTP).

1                   8.       **(Original)** The charge-switch NP probe according to claim 7, wherein  
2 said deoxynucleotide triphosphate (dNTP) is a member selected from the group consisting of  
3 deoxyadenosine triphosphate, deoxycytosine triphosphate, deoxyguanosine triphosphate  
4 deoxythymidine triphosphate and deoxyuridine triphosphate.

1                   9.       **(Original)** The charge-switch NP probe according to claim 6, wherein  
2 said nucleotide triphosphate (NTP) is a member selected from the group consisting of adenosine  
3 triphosphate, cytosine triphosphate, guanosine triphosphate and uridine triphosphate.

1                   10.      **(Original)** The charge-switch NP probe according to claim 1, wherein  
2 said fluorophore moiety is a member selected from the group consisting of fluorescein, 5-  
3 carboxyfluorescein (FAM), rhodamine, 5-(2'-aminoethyl) aminonaphthalene-1-sulfonic acid  
4 (EDANS), anthranilamide, coumarin, terbium chelate derivatives, Reactive Red 4, BODIPY  
5 dyes and cyanine dyes.

1                   11.      **(Original)** The charge-switch NP probe according to claim 3, wherein  
2 said fluorophore moiety is attached to said terminal phosphate via a linker.

1                   12.      **(Original)** The charge-switch NP probe according to claim 11, wherein  
2 said fluorophore linker is an alkylene group having between about 5 to about 12 carbons.

1                   13.      **(Original)** The charge-switch NP probe according to claim 11, wherein  
2 said linker carries at least one positive charge.

1                   14.      **(Original)** The charge-switch NP probe according to claim 11, wherein  
2 said linker carries at least two positive charges.

1                   **15. (Original)** The charge-switch NP probe according to claim **1**, wherein at  
2   least one of the phosphate moieties of said nucleotide phosphate probe has an ionized oxygen  
3   atom with a counter-cation associated therewith.

1                   **16. (Original)** The charge-switch NP probe according to claim **15**, wherein  
2   said counter-cation is a metal ion.

1                   **17. (Original)** The charge-switch NP probe according to claim **16**, wherein  
2   said metal ion is selected from the group consisting of  $Mg^{++}$ ,  $Mn^{++}$ ,  $K^{+}$  and  $Na^{+}$ .

1                   **18. (Original)** The charge-switch NP probe according to claim **11**, wherein  
2   said fluorophore moiety is BODIPY TR.

1                   **19. (Original)** The charge-switch NP probe according to claim **1**, wherein the  
2   difference between said first molecular charge and said second molecular charge is selected from  
3   the group consisting of 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.0, 2.1,  
4   2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, and 4.0.

1                   **20. (Canceled)**

1                   **21. (Original)** The charge-switch NP probe according to claim **1**, wherein  
2   said charge-switch probe is selected from the group consisting of compound 50, 51, 52, 53, 54,  
3   55, 56, 57, 58, 59 and 60 in Figures 6A-D.

1                   **22-48 (Canceled)**

1                   **49. (Previously Presented)** An intact charge-switch nucleotide phosphate  
2   (NP) probe, wherein, upon enzymatic cleavage of said intact charge-switch NP probe to produce  
3   a phosphate detectable moiety, said phosphate detectable moiety migrates to an electrode, and  
4   said intact charge-switch NP probe migrates to the other electrode.

1                   **50. (Previously Presented)** The intact charge-switch NP probe according to  
2   claim **49**, wherein either said intact NP probe has a positive molecular charge, or wherein upon

3 cleavage of said phosphate detectable moiety, said phosphate detectable moiety carries a  
4 different charge relative to said intact NP probe.

1                   **51. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 49, wherein either said intact NP probe has a negative molecular charge, or wherein upon  
3 cleavage of said phosphate detectable moiety, said phosphate detectable moiety carries a  
4 different charge relative to said intact NP probe.

1                   **52. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 49, wherein said charge-switch NP probe is a nucleotide triphosphate (NTP); and wherein  
3 said phosphate detectable moiety is a pyrophosphate with a fluorophore moiety attached thereto.

1                   **53. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 49, wherein said intact NTP probe has a positive charge.

1                   **54. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 52, wherein upon cleavage of said phosphate detectable moiety as a pyrophosphate  
3 fluorophore moiety, said pyrophosphate fluorophore moiety carries a positive charge relative to  
4 said intact NTP probe.

1                   **55. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 52, wherein upon cleavage of said phosphate detectable moiety as a pyrophosphate  
3 fluorophore moiety, said pyrophosphate fluorophore moiety carries a negative charge relative to  
4 said intact NTP probe.

1                   **56. (Currently Amended)** The intact charge-switch NP probe according to  
2 claim 49, wherein ~~said NTP probe~~ **said charge-switch NP probe** is a member selected from the  
3 group consisting of a deoxynucleotide triphosphate (dNTP), and a nucleotide triphosphate  
4 (NTP).

1                   **57. (Currently Amended)** The intact charge-switch NP probe according to  
2 claim 56, wherein ~~said NTP probe~~ **said charge-switch NP probe** is a deoxynucleotide  
3 triphosphate (dNTP).

1                   **58. (Presently Amended)** The intact charge-switch NP probe according to  
2 claim 57, wherein said deoxynucleotide triphosphate (dNTP) is a member selected from the  
3 group consisting of deoxyadenosine triphosphate, deoxycytosine triphosphate, deoxyguanosine  
4 triphosphate, deoxythymidine triphosphate and deoxyuridine triphosphate.

1                   **59. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 56, wherein said nucleotide triphosphate (NTP) is a member selected from the group  
3 consisting of adenosine triphosphate, cytosine triphosphate, guanosine triphosphate and uridine  
4 triphosphate.

1                   **60. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 52, wherein said fluorophore moiety is attached to said terminal phosphate via a linker.

1                   **61. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 60, wherein said fluorophore linker is an alkylene group having between about 5 to about  
3 12 carbons.

1                   **62. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 60, wherein said linker carries at least one positive charge.

1                   **63. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 60 wherein said linker carries at least two positive charges.

1                   **64. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 49, wherein at least one of the phosphate moieties of said nucleotide phosphate probe has  
3 an ionized oxygen atom with a counter-cation associated therewith.

1                   **65. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 49, wherein said counter-cation is a metal ion.

1                   **66. (Previously Presented)** The intact charge-switch NP probe according to  
2 claim 65, wherein said metal ion is selected from the group consisting of  $Mg^{++}$ ,  $Mn^{++}$ ,  $K^{+}$  and  
3  $Na^{+}$ .